THE OPTICAL MAGIC LANTERN JOURNAL
AND PHOTOGRAPHIC ENLARGER.
EDITED BY J. HAY TAYLOR.
A MAGAZINE OF POPULAR SCIENCE FOR THE LECTURE-ROOM AND THE DOMESTIC CIRCLE.
Entered at Stationers Hall
1889.

Vol. 8.—No. 92. JANUARY, 1897. DOUBLE NUMBER, *Price* 2d., *Post-free* 3½d.

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NOTICES.

THE *Optical Magic Lantern Journal and Photographic Enlarger* is issued on the 1st of every month, price One Penny, and may be obtained from all Newsvendors, Railway News Stalls, Photographic Dealers, or from the Publishers, at the following rates, post free:—

		United States.
12 months, including double numbers	2/6	75 cents.
Single copies	2½d.	8 ,,

EXCHANGE Column, General Wants, &c. (not Trade)—First 20 words, 6d.; and for every 3 additional words, 1d.

SMALL ADVERTISEMENTS must reach the office not later than the first post on the 24th of each month. All cheques and postal orders to be made payable to the Magic Lantern Journal Company, Limited.

EDITORIAL communications must be addressed, J. HAY TAYLOR. Advertisements and business communications to the **Magic Lantern Journal Company, Limited, 9, Carthusian Street, London, E.C.**

American Agents:—The International News Co., 83 and 85, Duane Street, New York City.

NOTES.

A Happy New Year.

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Index.—With this number is issued the index for the past yearly volume of this journal.

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Accumulators.—The inventor of the Firm Lantern Stand, described in our last number, writes to state that he expects shortly to have a set of accumulators weighing not more than 60 lbs., which will run a small arc lamp for about ninety minutes, I think (he says) lantern workers would rather use electric light even when difference of weight between cylinders and battery is considered. A set of accumulators could be charged for sixpence, and would thus be cheaper than oxygen.

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Stereoscopic Animated Photographs in Colour.—It is rumoured that Mr. Friese Greene is perfecting an apparatus which will show on the screen, not only what are termed animated photographs, but also in the colours of nature, and with stereoscopic effect.

Slum Life.—Many lantern lectures depicting slum life have lately been given throughout the British Isles, and these appear to have just hit the nail on the head as regards popularity.

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A Nice Present.—Bound volumes of this journal for the past year are now ready, and may be obtained from our publishers, price 3s., post free 3s. 4½d. This, and a copy of our ANNUAL (1s.), will form a very nice and interesting present for one to give any of his friends who are beginning to take an interest in lantern matters.

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Lanterns for Schools.—The Colchester School Board has decided to purchase three magic lanterns, with accessories, at a cost not to exceed thirty-three pounds.

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Eclipse of the Sun.—On the 11th ult., the photographs obtained during Sir G. Baden-Powell's expedition to Nova Zembla, were shown and explained at the Royal Astronomical Society. The photographs are said to be of particular interest and of great value.

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Rigg's Kinematograph.—The motive power in connection with the Kinematograph of Mr. J. H. Rigg, Skinner Lane, Leeds, is an electric motor, which not only ensures evenness of motion, but also frees the operator from much work. At 186, Chestnut Street, Philadelphia, U.S.A., Mr. Rigg has lately opened an agency.

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The Motorgraph.—The motorgraph is the name given to an apparatus brought out by Messrs. Watson & Son, which will not only expose films for animated photographs, but will also project them on the screen.

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Cinematographic Films.—We lately had an opportunity of inspecting a large stock of cinematographic films at the premises of Mr. Philipp Wolff, 9, Southampton Street, Holborn, W.C. In the catalogue which he issues (in English, French, and German) there are about two hundred sets enumerated. Most of these are kept in stock, others can be supplied at one day's notice. Those which we inspected were about 75 feet long, and very clear.

Death from Acetylene Gas.—About three weeks ago a youth at Olney met with his death, being found dead in the cellar of his father's house. A month or two ago he constructed a generator with which he was fond of experimenting. It is presumed that he opened the generator, which evidently contained some gas, with a light in his hand, for the bell of the generator during the explosion hit him in the face, inflicting a serious wound.

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Small Acetylene Generators.—Many persons make their own generators, and in our opinion some make them too small. We recently spent an evening with a friend who used a small generator of his own construction with which to light his dining-room. During the evening the gas gradually became exhausted, that is to say, that it eventually generated at a slower rate than it was consumed, so the taps were turned off, and we went into another room. In about half-an-hour, the unmistakable smell of acetylene gas reached us, and on investigation it was found that after turning off the taps, the generation of the gas went on slowly, and the capacity of the generator being small, the gas bubbled up through the water as soon as the bell was full; however, lights were kept away and the windows opened. A much larger generator will in future be used at that house, for there was something akin to a scare created.

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The Temperance Hospital.—Friends who are interested in this excellent institution, and also in magic lantern work, will be pleased to learn that a most interesting lantern lecture has just been prepared jointly by the Hospital Board of Management, and the United Kingdom Band of Hope Union, 60, Old Bailey, E.C., under the title of "A Visit to the Temperance Hospital." It comprises twenty-four photographic slides illustrating the various interesting features of the hospital and its work, and includes views of the exterior, the children's ward, surgical ward, women's ward, the operating theatre, the kitchen and various pleasing pictures of patients and nurses, together with well-known friends of the hospital. The descriptive lecture is written in a pleasing, chatty style by Miss Orme, the lady superintendent.

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Transparency Work.—Some time ago a paper was given by Mr. James Patrick, before the Edinburgh Photographic Society, on "Stray Thoughts on Lantern Slide Making," during which the lecturer pointed out that the excellence of slides depended on the quality pictorially and technically of the negative, and in this connection he remarked that, at the present time there seems to be a tendency to produce thin negatives, owing to the extensive use of gelatino-chloride papers. Such a character of negative was not well adapted for the best transparency work, although a good deal could be done in the way of obtaining passable results from such negatives by skilful manipulation. From a fully exposed negative, for instance, a crisp result can be obtained by under-exposing the transparency slightly; or from an under-exposed negative the harsh feeling caused by too strong contrasts can be rectified by fully exposing the transparency, though by doing so the key-note of the whole picture was lowered.

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Light Without Heat.—With several lantern experiments it is necessary to employ some means of preventing the heat rays from reaching the object or slide, and to this end an alum trough—or what is just as effective, a water trough—is used. With ordinary glass alone, the percentage of heat rays that pass through is about 85 or 86, but it appears that a new glass has been invented in Germany which allows only four per cent. of the heat rays to pass through, whilst the light rays are practically not obstructed. This new glass is said to contain about 28 per cent. of iron in the form of ferrous chloride. With such it would only be necessary to place a piece in front of a condenser which will dispense with the use of the present troublesome trough.

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Tin-Pot Lanterns.—Mr. Edgar G. Lee, in the course of an article in a contemporary, truly remarks: "Men without experience of any kind think themselves competent to entertain a large audience by means of a cheap tin-pot lantern, a twelve feet almost transparent screen, and an oil lamp with a chronic smoky chimney."

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X Rays and Tuberculosis.—From time to time various effects produced by X rays are being found out; one of the latest is their effect upon some pigs inoculated with tuberculosis. Eight guinea pigs were thus inoculated, and three were exposed daily to the X rays for an hour, these three grew fat and kept in good health, whereas the other five developed abscesses.

Lantern Slides in Natural Colours.

A LARGE business is done in the United States of America in connection with lantern slides which may be projected in their natural colours. A variety of such slides have been put on the market by Messrs. J. B. Colt & Co., whose headquarters are at Nassau Street, New York, with branches at Chicago, San Francisco, Boston, Philadelphia, St. Louis, Buffalo, and Atlanta, and with all these places of business it is quite reasonable to suppose that they get through a large number of slides of this particular kind.

The slides themselves are devoid of colour, being to all appearances ordinary photographs. When taking the negatives, three are taken respectively through a red, blue, and green filter or medium. From these three negatives transparencies are made. These are mounted in one large frame, each slide being covered by a coloured medium of the same tint as that used when making its respective negative. This, then, is placed in a triple lantern of peculiar form and projected on the screen. Great nicety is of course required to correctly superpose the three discs, for to produce the correct gradations of colour all three pictures are projected at the same time. Such pictures form a series of stencil plates, through certain parts of which the coloured medium is allowed to show.

The process is by no means new, but it appears that it has only lately been taken up from a commercial point of view and popularised.

We described an apparatus for the projection of plain photographs in colours in this journal for February, 1891, but since that time many improvements have been made, and in connection with this process the name of Mr. F. E. Ives takes a prominent position.

Prominent Men in the Lantern World.

No. III.—Mr. D. W. NOAKES.

THE moving spirit in the firm of Messrs. D. Noakes & Son, of Greenwich, is Mr. D. W. Noakes, whose portrait we give. He has claimed acquaintance with lanterns for the past thirty years, for at the age of eight he received the present of a toy lantern costing a few shillings;

this did very well for a time, but he then wanted something better, and having got this and used it for a while, wanted something better still. Wanting "something better still" eventually led to his having one of the best apparatus in use in those days, but even this did not satisfy him for long, so he determined between buying and making certain parts, to make his own outfit. So many improvements were thus added, that when exhibiting publicly, others desired to have certain attachments of a similar character added to their apparatus, and these Mr. Noakes undertook to fit.

1895.

This led to his fitting up a workshop in one of his father's (now D. Noakes & Sons) wholesale forage warehouses, close to the riverside at Greenwich. Here the business of a manufacturing optician grew to such an extent that space could not be spared for a showroom and a workshop, so seven years ago this department of Noakes & Son's business was removed to larger premises in Nelson Street, where, under the able management of the son, it grew apace, and even included certain engineering work, there being lathes capable of turning metal up to 30 inches in diameter.

Mr. D. W. Noakes is a busy man, for not only does he attend to a section of the forage business as well as the lantern department, but also devotes a portion of his time to dioramic lecturing, and some time ago undertook some extensive work in connection with hydraulic engineering, including the closing of a fracture six feet long in a costly hydraulic cylinder, worked at 600 lbs. to the inch. This he accomplished in a manner said to be unique in the annals of engineering.

In connection with the lantern and optical department, our readers are well aware how extensive this has grown, and how popular have become Noakes' patent triple dissolver, compound chamber jet, intermediate jet regulators, and other appliances.

It is with regret we learn (as far as lanternists are concerned), that at no distant date Mr. D. W. Noakes will be retiring from the optical department of the business engaged in by this firm, for owing to the retiring of Mr. D. Noakes, the senior partner, from active supervision in the forage business, much extra work devolves on the son, and although ably assisted by two brothers (junior partners), the firm has lately entered into some large contracts which will demand most of his time for some years, and with this end in view he has lately purchased a house in Westcombe, where, however, he intends to erect a miniature workshop with lathe and other necessary tools, so that when any idea pertaining to lanterns occurs to him he will be able to practically carry it out in a manner worthy of a lantern enthusiast.

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The Electric Light in the Optical Lantern.—No. III.

By CECIL M. HEPWORTH.

IN the construction of an automatic lamp, the armature working between the two magnets is seldom connected directly with either carbon; it is more usual to let it actuate a brake, and to so arrange the carbons that they will come together by their own weight whenever the pressure of the brake is slackened as it is when the arc gets too long, and the current in the main magnet gets proportionately weak. But enough has been said to show what delicate mechanism is required in a satisfactory automatic lamp, and it will not be difficult to understand that such mechanism may easily get deranged in unskilled hands, and that pretty extensive electrical knowledge would be necessary before it could be put into order again. Such a lamp, of course, if properly made, is an expensive article, but it is not at all necessary.

A lantern must always have an operator in attendance upon it all the time it is at work, and a simple arrangement for holding the two carbons in such a manner that they can be conveniently fed together by hand at intervals whenever the distance between them is becoming too great, is all that the lanternist requires; for this, hand regulation is only necessary once in every two minutes or thereabouts, and is no more trouble than the turning of a lime. Besides, it is a very great advantage for the lanternist to have the whole thing under his own control, instead of being dependent on a number of factors whose working he cannot see, and probably would not understand if he could.

So much for the mechanism by which the carbons are held, and the distance between their extremities duly regulated. We can now pass on to a consideration of the

best positions of the carbons

themselves, so that they should yield the greatest possible amount of light, and send it in the direction in which we require it to go for our particular purpose.

It must be remembered that the light emitted by the electric arc has, as it were, three separate sources of origin. First, and least brilliant of all, there is the actual arc itself—the band of light which marks the passage of the electric current across the space between the electrodes; secondly, there is the light from the incandescent point of the negative carbon; and thirdly, and by far the most important, there is the light from the crater of the positive carbon. For all practical purposes the two former need not be taken into consideration at all, for the small quantity of violet coloured light which is due to the arc itself, although of great actinic power, photographically speaking, is in such insignificant proportion that it has little effect upon the total, while the incandescent negative point is also of but little account.

So it will be seen that we have to deal with a source of light—the crater at the end of the positive carbon—which is barely a quarter of an inch across, and it is not necessary to point out to lanternists that this is just about as near to the ideal of perfection in lantern illuminants as any that could be found. However, some means must be adopted for causing this little crater to take up its position on one side of the carbon rod so that its light should be projected into the lens system, and not all round equally as it is in an ordinary street lamp. The manner in which this consummation is brought about is simplicity itself.

The light-giving crater

of the positive carbon, it must be remembered, forms at that point where the stream of electricity leaves it to jump across that space which separates it from the negative, and as electricity always chooses the path of least resistance, this jumping across occurs at those points of the two carbons that happen to be nearest to one another. Now, if the negative carbon is shifted about half its diameter in front of the other, the arc will form between the front edge of the positive and the back of the negative electrode. Consequently, the crater which always forms just opposite the nearest point of the latter, will take up its position towards the front of the upper carbon, and, being tilted upwards to a certain extent, will throw nearly all its light in the required direction. As a further aid towards the same consummation, the whole apparatus is generally tilted backwards through a small angle, as shown in Fig. V., where the forward displacement of the lower carbon with regard to the other, and the position of the positive crater to give the most efficient results is also set forth. Different workers have different ideas as to the amount of backward tilting which it is best to give to the lamp, and, of course, the greater the rake or tilt, the less it will be necessary to displace the positive carbon behind the other, so that as a deficiency in either sense can, within reasonable limits, be remedied by a compensatory plentitude in the other, it is

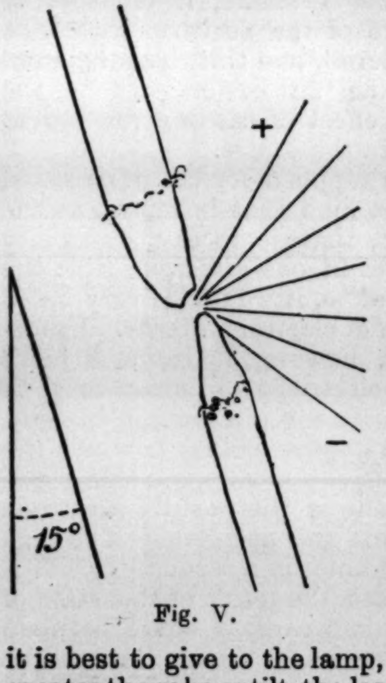


Fig. V.

difficult to say what is the best balance of the two factors. However, when I experimented in this direction, I decided upon fifteen degrees of backward tilt as giving the best results in my hands, and I have never had any occasion to alter it. It should be noticed that too great a displacement of one carbon behind the other will seriously impair the steadiness of the light. It seems to me the tilt of the lamp should be as little as possible, provided it does not necessitate such a displacement of the carbons as to make the light burn unsteadily.

I have already said that the electricity in an arc lamp flows between the two nearest points of the carbons, and as it is at those points that the greatest amount of action occurs, it may be supposed that the

consumption of the carbon

is quickest in those places, and they will not long remain the nearest points. When they are burnt down to a certain extent, they naturally become farther apart than the neighbouring portions, and the arc, ever mindful of its path of least resistance, shifts round a little way and transfers its attention to another field, and when that, in its turn, becomes less eligible, yet another position is sought, and with every change, of course, the position and direction of the light is altered. In order to obviate this unsatisfactory state of affairs, it is usual to place in the centre of the positive carbon a core of softer material, and this, burning more quickly and offering an easier path to the electricity, has the effect of causing the arc to retain its position in the centre.

If all electricity supplied for the purposes of lighting were of the kind that is known as the continuous current, that is to say, electricity which always flows in one direction, from the positive to the negative, it would be very much better for the users of electric lanterns. Unfortunately for them, however, it is much more convenient to the electricians in many cases to instal what they call the alternating current, which, as its name implies, is that in which the direction of flow is continually changing, and what at one moment is the positive electrode becomes in the next the negative — a change which occurs many times in a second.

As will be supposed, the result of this state of affairs is that the two carbons share between them the characteristics of both. Each burns away at an equal rate, so that rods of equal diameter should be used. Each forms into a blunt point with a slight indication of a crater at the end, and the wandering about of the arc from place to place on the carbon ends is very noticeable. A similar precaution to that taken to obviate this fault in the case of the continuous current is resorted to, and both carbons are cored, with the result of very greatly improving the steady burning of the light, though not sufficiently so for lantern purposes. The slight tendency to wander around which the alternating arc retains even under the best of circumstances, is not marked enough to be very noticeable in street lighting lamps, but in the lantern it has the distressing effect of varying the intensity of the light on the screen, which appears alternately to blaze up and sink away to half the brilliancy.

The ordinary alternating arc has another serious drawback as regards its utilisation for lantern illumination. It has the nasty habit of casting a heavy

purple shadow

right across the centre of the sheet, the reason for which defect will be seen by reference to the accompanying diagram, Fig. VI. In order to force the arc to retain an approximately central position, as has already been said, cored carbons are used, and this remedy has the secondary effect of causing two deep craters to form at their ends, and it is from these two concavities that most of the light of the lamp emanates, the upper crater throwing all its light in a downward direction, while that from the lower one is all thrown upwards. Consequently, there is no light at all in a horizontal direction except that from the outsides of the craters, which is very little, and the light of the actual arc itself, which is of a deep violet colour. This is the reason of that violet band which is seen encircling the globes of all street lamps and the like which are run upon an alternating circuit. Another serious disadvantage of alternating arc lamps is the humming noise which always accompanies their burning, and which is produced by the very frequent change of direction of the current. Up to the present no cure has been found for this somewhat distressing complaint; but the noise is not loud enough to be of great importance in a hall of respectable size.

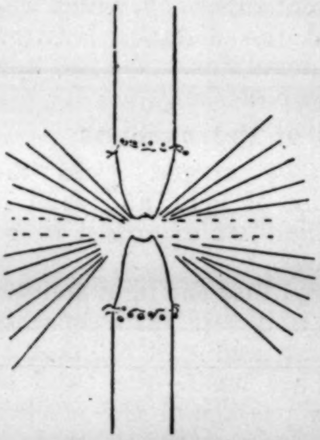
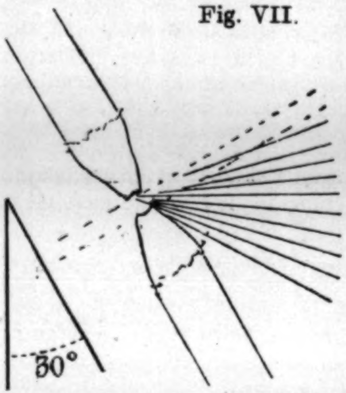


Fig. VI.

If the lamp be tilted backwards through an angle of about thirty degrees, as in Fig. VII., all the light from the upper carbon will be projected through the lenses, and will yield a tolerably clear disc, but such a plan, of course, involves the entire loss of the light from the lower carbon, whose crater, being directed towards the back of the lantern, simply wastes its radiance on the desert air, so to speak. I have tried several experiments with electro-magnets, magnetic helices, "shells," etc., with the idea of inducing the arc to take up its position towards the front edge of the carbons, and to stay there, for the ordinary electric arc is powerfully repelled by magnetic influence. However, the alternating current, as is its wont, refused to obey the laws which would have governed its more tractable brother, and my efforts were not satisfactory. The idea, of course, was to cause the arc to burn at the front edges of the carbons, so that they would be consumed faster at those places, with the effect of tilting the two craters away from one another, so to speak, in the front, so that all the light from each would be projected in that direction.

Fig. VII.



Then it was suggested by my father, Mr. T. C. Hepworth, that if special carbon rods were made with the soft core placed slightly to one side, that side, having thinner walls of the hard, slow burning material, ought to burn quicker, or slightly in advance of the other side, and thus the crater would be tilted up towards the edge to which the core was nearest. He had a few carbons made on this principle, and the effect was so highly satisfactory in every way that it was made the subject of a patent. Two of these special carbons so placed in a lamp that their thinnest walls are nearest to the condenser, will, under the action of the alternating current, quickly burn to the form shown in Fig. VIII., where it will be seen that practically all the light from both craters finds its way direct to the lenses, and, as a matter of fact, this diagram is not at all overdrawn, for by this method the alternating arc is very nearly as efficient for lantern work as its more straightforward rival, while the waste light from the back of the lamp is practically *nil*—it is hardly enough to cast a shadow at a few yards distance.

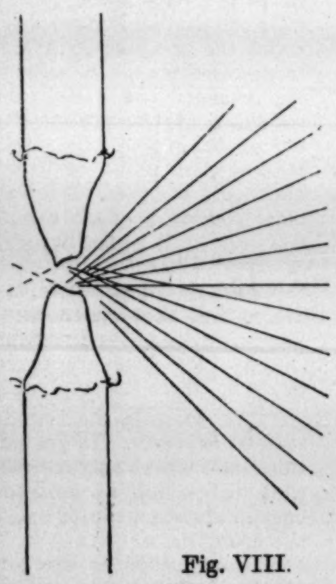


Fig. VIII.

(*To be continued.*)

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Acetylene in Practical Use.

By HENRY. J. WALKER.

As a luminant for the lantern I do not think that acetylene can be equalled, except, of course, by the limelight. The best oil lamps made give a miserable light beside it, and the portability of the apparatus required makes it a rather formidable opponent to the limelight, where the carriage of gas cylinders is a consideration. I might say that I used acetylene last month in a hall seating about 1,400 people, to say nothing of audiences of 400 or 500 people. In every case acetylene was used in place of an oxy-hydrogen bi-unial lantern, which was unusable owing to defective regulators. As the size of the picture was about 15 feet, I think the most **sceptical lanternists** must admit that they now have a gas which is at once really cheap, and the necessary apparatus both light and simple. I have a room fitted for acetylene gas, and for house lighting I think it superior to any light I have yet seen, the simplicity and automatic working of the generator making any attention unnecessary after once being charged with the necessary amount of calcium carbide.

I have heard as yet very little of its use by lanternists, and I do not think some of our lantern makers favour its use very much; in fact, a few weeks ago a person was purchasing an oil lantern, and on making some inquiries about acetylene the attendant said, "They had done nothing in acetylene as yet; in fact, if they did it would not be for some time—it was far too dangerous, and they wanted to see some of the others doing something first." I think to make a statement like this is very misleading. The expression, "far too dangerous," would not tend to make anyone who did not know much about it very anxious to try it. No doubt there is a certain amount of danger in using acetylene, but so there is in using most other things. One thing, when acetylene is generated, in most of the generators there is very little pressure, for as the gasometer gets full it automatically leaves off making gas. I have as yet only found one drawback whilst using acetylene, and that I think could soon be remedied. The jet I use has two burners, one about ¾ inch behind the other. After the lantern has been in use about 1¼ hours, the back burner has a tendency to smoke owing to the small orifice becoming in some manner choked; perhaps **some other correspondent** who has encountered a similar difficulty will be able to explain. Any lanternist who is travelling a good deal, cannot, I am sure, do better than give acetylene a trial. Calcium carbide can now be obtained at a reasonable rate in London, and I would advise all intending purchasers to get price lists before sending any orders, as certain firms are advertising calcium carbide in 7-lb. lots at 4d. per pound, and yet their list price is 1d. or 2d. more.

I have hopes of soon seeing acetylene dissolvers in the market. Taking into consideration the difficulty often experienced in getting cylinders refilled and carried from place to place, I think the travelling lanternist has a real boon where medium-sized audiences are the rule.

The Lanternist's Practical Cyclopædia.—No. III.*

By CHARLES E. RENDLE.

Argand Lamp.—A lamp with a circular wick, through the centre or axis of which the air currents supply the flame with oxygen, increasing to a large extent its brilliancy. It was at one time the popular lamp for the lantern.

Asbestos (indestructible).—The term denotes a curious form assumed by a variety of minerals, rather than to particularise any given species. The singular property of asbestos is its power of resisting ordinary flame, and in consequence is incombustible. It is used for innumerable purposes; among the many may be mentioned asbestos packing for lanterns, saturators, etc. Some of the best lantern lamp wicks also are interwoven with it.

Atmosphere.—*See* Air.

Atom.—The Atomic Theory was first propounded by John Dalton in the beginning of the present century. Anything extremely minute is termed an atom, but it is in chemistry that it plays the most important part. According to Dalton and other scientists there are between sixty and seventy varieties of atoms, which correspond to the same number of elementary substances, and hydrogen gas, being the lightest of atoms, its square root being one, it is accepted as the unit or atom of comparison; oxygen being sixteen times heavier than hydrogen, it follows that an atom of oxygen is sixteen times the weight of the hydrogen atom. The atom of iron is fifty-six times that of the hydrogen, the atom of carbon is twelve times as heavy. Dalton maintained that these elements would not combine except in certain fixed proportions by weight, and not as one might think fit to mix them. The ultimatum is therefore, that the atoms must bear to each other the same relationship in weight. Students of chemistry are advised to read up the term, as it is an all important one.

Automatic Carrier.—A self-acting carrier, or a carrier so constructed that when certain parts are touched by the hand, the slide is operated upon by secret springs, or other hidden means, to produce the change or movement intended.

Automatic Lantern.—*See* Lanterns.

Automatic Regulators.—*See* Regulators.

Axis.—A term used in most sciences, but with some modifications of meaning, although the straight or centre is the outcome of each. The axis of rotation, in mechanics, is the line around which a body revolves. The visual axis, or optic, would be a ray of light from any source or object, falling straight upon the eye. Geometry, anatomy, botany, physics, etc., etc., each have their particular axis.

Barometer.—An instrument for measuring the weight or pressure of the atmosphere. The mercurial barometer in general use consists of a glass tube about 36 inches long, hermetically sealed at one end, which is filled with mercury, and inverted in a vessel which is also charged with mercury. The liquid column in the tube descends some few inches, leaving a perfect vacuum at the top. After the invertion of the tube, the surface of the mercury cannot remain in one plane, as is the case when the atmosphere presses on every part equally, so it rises where protected from the air, until the pressure equally balances the parts excluded from the atmosphere with the part exposed. And if we measure the mercurial column, we arrive at a just estimate of the pressure on the atmosphere. The barometer is frequently spoken of as the weather glass, whereas, in point of exactness, it tells us nothing about the weather. It is but an indicator of the weight of the column of air around and above us, and only rises and falls as the weight increases or diminishes. Weather changes, however, coincide generally with the change of pressure, so although not essentially connected, the barometer is regarded as a weather gauge. Since its discovery by Torricelli, about 1640, it has not been improved upon, and perhaps can never be, from the original simple form.

Base.—In science, the foundation upon which a thing stands or rests. In geometry, the lowest geometrical side upon which a figure stands or rests. In chemistry, that with which an acid combines to form a salt. A base is always a compound body, the oxide of a metal, the grouping of elements playing the part of a metal; such compounds as are formed by the union of the alkali metals with oxygen, etc.

Bathos.—The ludicrous descent from the elevated in art, good taste, etc., to the mean in speech or writing, and should specially be discountenanced by all public speakers.

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Bell Metal.—*See* Alloy.

Benzine, or Benzole.—A very volatile liquid, and when mixed with air its vapour is highly inflammable and explosive. Large quantities are now distilled from the portions of coal-tar oil, which boils below 212° F. Benzine, chemically pure, may be obtained by distilling benzoic acid with quicklime. For the past few years, it has been largely used by lanternists in connection with the saturator, though ether, it may be noted, is rapidly superseding it.

Bicarbonate.—Carbonate consisting of two equivalents of carbonic acid to one of a chemical base.

Bijou Lantern.—Meaning a small and pretty lantern.

Bimetallic.—Consisting of two metallic substances.

Binocular.—An instrument having two eye pieces, or holes, suited for both eyes.

Binocular Lanternescope. — An instrument constructed to enable one to view lantern slides many times magnified, using both eyes in so doing. A pair of plano-convex lenses 1½ inches in diameter of 7 inches or 8 inches focus are employed, in conjunction with a prismatic lens of a like focus, each set being mounted at the approximate distance of the eyes apart. The prisms are mounted, and set opposite to the stereoscopic arrangement. These lens being thus set in juxtaposition will give a focus of 3½ inches to 4 inches. By the aid of an instrument of this kind the lanternist has many advantages, the greatest perhaps being in the preparation of his lecture.

Bismuth.—A metal principally found in the metallic state. Its properties are that it is very brittle, of a reddish white colour, highly crystalline, and its weight being ten times heavier than water. Its fusing point, about 260° C., is much used in the sciences and medicine. It is the chief factor in what is known as fusible metal. To its 8 parts, 5 parts of lead and 3 parts of tin are melted together, the fusing point of this latter alloy being so low as 100° C., the same as boiling water at the normal temperature.

Bi-Tri-Single Lantern.—As its name implies is a combination lantern, and may be used either as a triple, bi-unial, or a single instrument, the agency of screws and bolts being used for its attachments.

Bi-unial Lantern.—A term given to a double lantern standing vertically; thus we get a top and bottom lantern. Bi-unials are made in many varieties—in tin, Russian iron, and wood, the latter having a tin, or iron lining, and what is sometimes called the inner lantern. The bi-unial has many advantages over a single lantern, the greatest of these being its perfect adaptability for dissolving, which is achieved in the simplest way, viz., a dissolving gas tap is fixed at the back of the lanterns, so constructed that the gas may burn either in the top or bottom, or both lanterns together. The effect of thus shutting off the light from one picture, and opening it upon the next, at one and the same time, is that while one scene is fading from view, the succeeding one is taking its place.

Block Tin.—*See* Tin.

Blocking Out.—A term used in relation to the shutting off of light from certain lantern slides, more especially those of statuary. In thus treating a transparency of this kind, by painting out with black varnish all but the actual statue, much is added to its effect on the screen.

(*To be continued.*)

Suggested Form of Quick-Acting Carrier.

By G. R. BRYCE.

THE need of a really quick-acting carrier for the single lantern has often struck me, so I have devised the following form which would, with improvement, I think form a really serviceable article. The following is merely a suggestion. I have never carried the idea into practice, but can see no reason why the device should not be possible.

Like the carrier described in this journal for September, it must be used with the science type of lantern, or one in which the stage and front tube can be altered and arranged to receive it.

The sketches look a little complicated, but will become simple after short study. It is noticed in the first place that a substantial frame of wood is required as a foundation for the other, or working part of the carrier; a sketch of this is given in Fig. III. Further, it will be observed that two sheaths (Fig. II.) or carriers of some suitable metal—Russian iron or tin as used for plates in a hand camera—are intended for the reception of the slides. These are fixed in the manner shown to two cog-wheels—more correctly parts of cog-wheels, as they only contain an angle of between 90° and 120°—of brass or any suitable metal. One complete cog-wheel is required, and is supplied with a small handle in finish similar to those used for chromotropes, etc.; this wheel is fixed at the centre of the end of the wooden frame as shown.

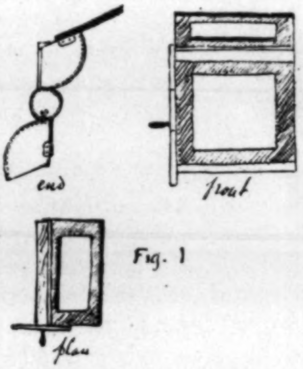


Fig. 1

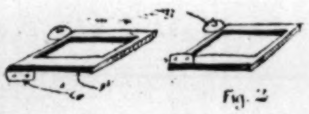


Fig. 2

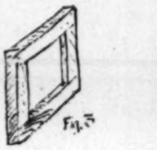


Fig. 3

The sheaths are fitted to the cog-wheels and then to the frame as drawn, and the manner of working is evident. In order to prevent the sheaths knocking each other during changing, the wheels are made of the shape given.

This carrier, with slight alteration, could be made for use transversely, but I think the up and down movement would give a better effect on the screen, besides enabling the operator to manipulate the slides without reaching over the lantern.

Not having tried this carrier, I cannot say exactly what the effect on the screen will be, but imagine if the handle is turned quickly as intended—the carrier must not work stiffly—the magnified result will be much more pleasing than that given by any other carrier I know of.

The method of fixing the instrument to the lantern will depend largely upon the kind of stage or opening. I need not mention it is essential that the carrier can be speedily removed or inserted before the condenser.

No doubt should any reader consider this device worthy of a trial he will be able to make many small improvements on the carrier, thus letting it fill a long-empty blank.

The Invention and Development of the Optical Lantern.

By **EDWARD DUNMORE**.

CHAPTER VIII.—*Continued.*

THE carrier alluded to is a small frame fitting into the stage of the lantern, and designed to facilitate the insertion and withdrawal of the slides. There are many forms in the market, most of which have some good points. They should provide for centering the slide, so that it can be pushed in without danger of pushing it too far; at the same time keep the slide upright and steady, and with a little pressure pass on to admit the next slide, when the previous one can easily be lifted out and returned to its receptacle.

Supposing gas is not available, we have to fall back on **oil lamps,** of which there are a great variety, with from two to four wicks, and made to burn both colza and mineral oils. Those consuming paraffin oil are most generally used. The Stocks' lamp burning oil with four wicks, and advertised to be of 109 standard candle-power, is a recent introduction. The three-wick lamps of Newton and others give an excellent light if properly trimmed and attended to, the wicks in all cases inclining towards each other so that the flames are solid and intense as possible, and are regulated by milled heads at the backs of the reservoirs. It is important in trimming the wicks that they are cut *evenly* and *smoothly*, and do not fit *too tightly* into the tubes; if they catch at all in turning up they may get higher at one end than the other, and smoke. Providing they are started level, merely smoothly rubbing off the charred ends after use will be better than cutting. It is a good plan to dip the wicks in vinegar, and dry well before use. The slightest trace of oil left on the outside of the burners or reservoirs is the principal cause of oil lamps giving off disagreeable odours, and unevenness of the wicks produces smoking if turned up to their full working height. The solution of a little camphor in the oil is advocated by some, but for my own part I see little or no difference to the intensity of the flame by the addition. Naphthalene has also been used for the same purpose.

The value of the oil light depends on its intensity and not on its size; the less the flame the better, provided it makes up for size by brilliancy. The much-talked-of acetylene may provide another useful illuminant. The Welsbach incandescent system, although a vast improvement for ordinary illuminating purposes, depends for its light somewhat on the size of the incandescent mantle, which of course would not supply the lantern with the same *proportionate* advantages as for ordinary illumination, although an excellent light might be anticipated from its adoption.

CHAPTER IX.

WHEN lanterns are used in twos or threes they are termed the bi-unial and tri-unial arrangements. The use of more than a single lantern provides for a great **variety of effects** otherwise impossible, the most simple of which is termed a dissolving view. This is effected by gradually lowering the light of one lantern, at the same time increasing that of another, or by cutting off the light by a screen which uncovers one lens at the same time it obscures the other. Some lanterns for this purpose are arranged side by side; with the triple lanterns they are almost always used one fitted above the other, as being the more convenient method. The greater the number of lanterns, the more varied the effects possible; when a semi-transparent screen is used with the lantern in one room and the audience in another, the device of moving the lanterns about, approaching them nearer or removing to a greater distance, adds immensely to the variety of effects, but as a rule the lantern or lanterns are fixed on a stand at the rear of the audience, and there they remain until the close of the show. The variations in the pictures are usually limited to the mechanism of the slides and the employment of different lanterns simultaneously from fixed standpoints. An increase in the number of lanterns gives corresponding work to the exhibitor; although two lanterns may be worked single-handed, it is very much better to have an assistant when more than one has to be attended to if the exhibition is to proceed evenly and without hitch. If a tri-unial arrangement is being used, there are six different taps for gas alone requiring attention, as well as three limes to keep adjusted, to say nothing of the introduction and withdrawal of slides and coloured screens. A mechanical slide will alone engross the attention of one person to work it properly. Whatever the number of lanterns, they must all be correctly focused on the same place on the screen. When placed one over the other, this adjustment is facilitated, and on that account is given the preference, otherwise a wide table top would be necessary.

The screen is an important part of the fittings for a lantern exhibition, and now receives more attention than it formerly did.

Nothing is more unsightly

than a sheet of questionable cleanliness hanging in festoons and creases. The screen to the lantern bears the same relation as the mount to the picture. It should be opaque, colourless, and without markings, and at the same time perfectly flat. A wall cemented and whitened is the best screen of any, as it absorbs so little light; but as a wall cannot be moved about, a portable screen becomes necessary. Recently some capital screens have been put on the market by one or two firms, rolling and unrolling like the drop-scene at a theatre, and fitting into a case when done with. They are flexible and a dead white, and answer their purpose admirably. The ordinary sheet consists of white bleached sheeting fastened to a framework by hooks and tapes, or merely hung up by the top edge. If it be joined, the seams should run horizontally and not vertically, as in the horizontal direction they are less visible, and the sheet hangs better. It should be strongly taped along its edges, and rings sewn on about a foot apart, when it can be hung to nails in the wall of the room, and the bottom corners fastened by cords to screw hooks in the floor. If no wall is available, a cord stretched tightly from one side of the room to the other through the rings or eyelet holes will allow it to hang tolerably straight; the two bottom corners can be fixed to the floor to keep air currents from blowing it about. If a frame is used consisting of bamboo or light wood with fishing rod joints, the sheet is laced to it all round and thus smoothly stretched. The more *opaque* the screen is the better, as the reflection of light is in a great measure determined by its opacity.

When the size of the projection does not exceed 4 feet, the screen can be made of tracing paper stretched on a light wooden frame, and the picture viewed by *transmitted* light. Providing the illuminant is weak, the picture will be much more brilliant seen in this manner than in the ordinary way. Two sheets of ground glass with their ground surfaces close together make an excellent screen for small displays.

CHAPTER X.

Photomicrography is another phase of photography, and is admirably adapted for lantern work. The term indicates the *enlargement* of microscopic objects by photography—microphotography being the production of microscopic photographs for use in the microscope. As confusion sometimes exists as to the proper term to be used, it is perhaps as well to explain the difference. Slides produced by photomicrography have almost entirely superseded direct projection by the lantern microscope, the drawback to which formerly was the exceedingly poor illumination, which made it very difficult to see the detail even of fairly transparent subjects. The electric arc light has, however, somewhat modified this objection, but with the photograph of 3¼ inches we have the advantage of ordinary lantern illumination, and the objects are as bright and distinct as any other slide, the difficulties of density in the object itself being already overcome in the photomicrograph. I need not say that most elaborate instruments are constructed for the purpose of making these slides, which are purchasable at any good opticians.

Explosion.—While experimenting in connection with the compression of acetylene gas, Herr Georg Isaac and three of his assistants were killed by an explosion on 12th ult. As all those engaged in the experiments lost their lives, there are no definite particulars known as to what was actually being done at the time the catastrophe occurred.

Fireproof Paper.—A fireproof paper can, according to the *Correspondenz*, be made by incorporating 95 parts of asbestos fibre, which have been bleached in a solution of calcium permanganate, and afterwards treated with sulphuric acid, with five parts of wood pulp. The mixture is then pasted by lime-water and borax, and spread in the usual way. This paper, it is said, will withstand even a white heat without charring.

Slides.—No. III.

THEIR PRODUCTION.

By **F. J. SCRIMGEOUR.**

IT will be my object this month to give a short account of the various branches of photography, and the processes with which photography is intimately connected, which are chiefly used in the production of lantern slides. I will not attempt to describe each process in detail, as it is not so much my intention to give directions for slide-making, as to weigh the advantages and disadvantages of the resulting transparency simply from a lanternist's point of view.

All lanternists know the three qualities required to render a slide a success technically; first, absence of fog or muddiness; secondly, proper density all over; and lastly, a pleasing tone. Keeping these three qualities in mind, but dismissing meanwhile the artistic qualities of the slide as a picture, let us proceed.

Opinions differ regarding which process gives the finest result in monochrome when projected upon the screen; enamelled albumen, Woodbury, carbon and wet collodion, each has its advocates.

The enamelled albumen

is a splendid process, the finest in my opinion in it, the texture of the film of the commercial plate is made finer by the application of albumen in solution. The process was originally used for microscopic slides, where the comparatively coarse grain of the ordinary film was found objectionable. Its sphere of usefulness, however, has since been increased, and certain high-class sets of landscapes, etc., can now be had in enamelled albumen. The process is extremely difficult, and the cost makes such transparencies expensive luxuries to the average lanternist.

Carbon and Woodbury type fall naturally into their places beside each other, for they are near relatives, the latter being practically the commercial and mechanical modification of the former. Slides by the carbon process are not to be had in the ordinary market, but those who have seen some of the lovely transparencies which have come from the hands of the leaders in the photographic world will know that they are hard to beat. They owe their existence to the fact that gelatine, sensitised with bichromate of potash, becomes insoluble when acted upon by actinic light. Therefore, when prepared tissue is exposed under a negative and then washed in warm water, the unexposed portions —which will be the high lights—are dissolved, while the rest of the gelatine film remains insoluble. As the original gelatine may be of almost any tint, there is a great variety of tone possible, and that colour can be chosen by the photographer which best suits the subject. As I said before, it takes very fine work indeed to excel a carefully made carbon slide.

Woodbury type is the finest photo-mechanical process in existence. A carbon transparency is covered with lead sheeting and then subjected to great pressure. It is curious, but yet true, that the gelatine relief imprints its form in all its delicate details and gradations upon the leaden surface, forming of the latter a "cast," or mould, of the required picture.

Gelatine in a thin liquid form and tinted to the most suitable colour is then poured upon the mould, and in a press prints are taken off on glasses of the usual 3¼ by 3¼ size.

Theoretically, this process should be equally suitable for slides of all subjects, but in practice I have not found it so. Anything finer than a set of high-class statuary in

Woodbury type

I cannot conceive, but in many landscapes it does not do justice to that "something"—haze, atmosphere, and perspective all combined — which gives "distance." One set I know well, in which the scenes of figures, interiors, etc., are admirably rendered, but the wider views — of whole towns or long streets, for instance—are most disappointing. Such have the appearance, when projected on the screen, of those bird's-eye views which have been recently introduced into the schoolroom, in place of ordinary maps, as being more interesting to children.

But it is by the wet collodion process that the large majority of commercial slides are made. It suits the professional slide-maker exactly, for by it many slides can be turned out ready to be placed on the counter in a very short space of time. Moreover, it is the least expensive process of all, and lends itself equally well to the representation of all subjects; and when we add to all these advantages the fact that the collodion film forms a splendid surface for the application of the painter's tints, it would seem as if one side of our critical balance would be very high indeed, and so it will be, even after we have placed our only "growl" upon the empty pan. It is this: the tone of the uncoloured commercial wet collodion hardly ever varies. The subject may be seascape, harvest scene, or beetle's wing, the slide will have the same "slatey" black tone in each case. This is because what the dealer terms "the best developer," namely, sulphate of iron, always gives a cold tone. Pyro will form a brown or even red image, but then you see it is not so convenient for the rapid production of quantities. However, with that exception everything tends to make the lanternist pleased with wet collodion slides; the shadows are transparent, the high lights clear, and there is brilliancy and crispness about them which cannot be excelled. Before I proceed any further I must stop for a minute and explain that pyro is used by professionals in the development of some of the finer microscopic transparencies. It is not the resulting colour, however, which causes them to do so, but rather the fact that the texture of the collodion film becomes finer during the process, a point which is all important in that class of work.

Many photographers consider a collodio bromide transparency to be *the* perfect slide.

The process may briefly be described thus: An emulsion of collodion in which pyroxyline has an important position is sensitised with bromide of silver. The small squares of glass are well cleaned, and then coated with this preparation. They are then sensitive plates, and when dry may be exposed to the negative by contact or reduction. A weak developer (pyro or iron) will then give an image as delicate in gradation as it is clear in the shadows.

(*To be continued.*)

Toning Lantern Slides.

TH. J. PLACZEK, of Vienna, in *Photographische Correspondenz*, gives the following directions for the toning of collodion transparencies. If pyro-gallic be used, instead of iron, for development, a pleasing blue-black deposit results, that can be easily toned with neutral chloride of gold, chloride of palladium, etc.; but the large addition of glacial acetic acid to the developer makes double the exposure necessary as compared with iron development. In consequence of this, attempts have been made to tone the grayish-black image of iron-developed positives, and the following bath has been found very useful:

Solution of potassium chloro-platinite (1·50)	4 c. c.
Nitric acid	12 drops.
Solution of chloride of gold (1·50)	3 c. c.
Distilled water	550 to 600 „

The plates, after fixation with hyposulphite of soda, or preferably cyanide of potassium, are well washed, and while still wet placed in the toning-bath for one to two minutes. They acquire a blue-violet tone, which is found very suitable for lantern slides or stereoscopic transparencies. Dry collodion plates may also be toned in this bath, but the process is much slower, owing to the horny character of the collodion film, which resists the penetration of the solution. A bath of potassium chloroplatinite (1:1400), slightly acidified with hydrochloric acid, gives a blacker tone. A solution of—

Water	500 parts.
Sulphocyanide of ammonium	20 „
Hyposulphite of soda	½ part.

added in equal quantity to the following:

Water	500 parts.
Chloride of gold solution (1·50)	30 to 40 „

gives gray-blue tones. Platinum and gold toning is very successful with these baths.

How to keep Film Slides Flat during Exhibition.

By F. NEAT.

SLIDES on films are a decided advantage over those on glass, as about a dozen can be got into space occupied by one glass slide, to say nothing of the lightness in weight of the films. In the days to come, it may safely be presumed that slides on glass will be old-fashioned or obsolete. Many people at present use film slides, but mount them between two glass plates; the only advantage of this being that if the slide happens to have a fall and the glass cracks, one can dispense with the anxiety as to whether it is the glass with the picture or the cover glass that is cracked, as is a source of anxiety when an ordinary glass slide happens to fall.

There is no necessity whatever for mounting a supply of films between two glasses and binding them up. Two glass mounts are all that is necessary, and these mounts are quickly made.

Take two cover glasses, and having placed a film between them, proceed in the usual way to bind them up with strong binders; and when these are quite dry, run a penknife along the binders on three sides, leaving the fourth to act as a hinge. The reason for placing a film in before binding up is to allow a little thickness at the hinge.

When a film slide is to be used the glasses are opened out bookwise, a film inserted, the glass closed up again, and the whole thing inserted in the carrier.

It would perhaps be an advantage to gum a mat to the inside of one of the glasses.

* * *

How I Made my First Generator for Acetylene Gas.

By **R. MOSS.**

NOW that acetylene gas is coming more into notice, and daily gaining ground in popular favour as an illuminant, one quite expects to hear many erroneous and misleading statements concerning the imperfections and the dangers attendant upon the use of it. It must be borne in mind, that if the gas establishes itself as an illuminant for domestic use, it comes into opposition with powerful interests; to wit, the petroleum industry, lamp trade, gas companies, and others, while even for lantern and photographic purposes it will displace many of the artificial lights now in use. Consequently, one must be prepared for this kind of thing; at the same time, it would be well to refute statements as publicly as possible whenever opportunity arises.

There is no doubt that acetylene gas is one of the finest illuminants yet brought out, and above all, most easily obtainable. I will admit that generators are not yet all they might be; still, there are several thoroughly reliable ones on the market which will give satisfactory results.

The plea that it is injurious to health cannot be maintained, inasmuch as several eminent medical men have testified that, both in the natural state and also in process of combustion, it is much less injurious than coal gas; but the

"danger bogey"

can be, and is trotted out. Hence this article to show, not by argument but by actual practice, how much—or rather, how little—danger really exists.

When I read in the OPTICAL MAGIC LANTERN JOURNAL, about two years ago, that acetylene had been discovered, I was at once impressed with the utility of the discovery, provided, of course, that the carbide could be produced cheaply enough to bring it into general use. At the time most of the papers dismissed it as visionary and unpractical, and I would here congratulate the editor of this journal that he did not follow the lead, but kept true to his first and, as events have proved, correct judgment—but now to business.

For a long time I was unable to procure any carbide to experiment with, but at last I succeeded and commenced operations. Here let me say that I then knew nothing whatever about the properties or pressures of gas.

My first attempt was in the direction of a gasometer generator. I found, however, so many objections that I discarded the principle altogether. One of the chief drawbacks was that, should the carbide become exhausted during a lantern exhibition (for that was my first idea) it would be

impossible to recharge

without putting out the lights for perhaps ten minutes, owing to the quantity of air to be displaced after that operation; while with an excessive charge to provide for emergencies, the surplus would have to be released ere the apparatus could be removed. Consequently, I took up the principle of water pressure.

I knew that (as described some time back in this journal) if a vessel were divided horizontally, and a pipe fixed in the partition reaching nearly to the bottom of the lower division, this being filled with water, that if gas were conveyed into this lower division, entering at the top, it would displace the water and force it up the pipe into the upper chamber or cistern. I also knew that water would find its own level, and working upon these principles I constructed the following apparatus:—

The water tank and gas holder was square, 7 inches by 7 inches, and 15 inches deep; it was divided into two, a lower or gas holder, 9 inches deep, and an upper or cistern, 6 inches deep, the two being connected by a brass pipe fixed in centre of division, and reaching from that nearly to bottom; a hole was made in one side exactly in the centre of gas holder, and a screw plug fixed on the opposite side close to bottom to empty the water when necessary.

The generator, 7 inches by 5, and 6 inches deep, was soldered on the side, the bottom being an inch below the hole in gas holder, while a false bottom of perforated zinc was fixed just above that hole; the top was covered in, except a round opening 4 inches in diameter, which was to be closed by a gas-tight cover secured by a central screw.

My theory was, fill apparatus with water as far as the division of tanks, it would at the same time flow through the hole into generator, which would also be filled *to the same level*; the carbide is now to be *dropped* in, and the gas-tight cover secured, then gas would be produced, conveyed by a pipe fitted with tap into gas holder, displace water (which would be forced up through central pipe into upper division or cistern), at the same time water in generator would return to the gas holder, keeping at the same level in both chambers until it was below the carbide (on perforated bottom), when the supply of gas would be automatically stopped. A burner was fixed to the outlet pipe, as shown, over top of generator in photo.

But alas for theory! This is what really happened. No sooner was the burner lit than a pop occurred in the cistern, repeated at intervals of about a second, until the gas-tight (?) valve fired

with a loud bang,

the flames rapidly spreading all round. A very few seconds of this was satisfying, and a bucket of water put an end to experiments for that time.

After some study, I came to the conclusion that the cause could only be a leak in the division which allowed gas to pass up through the water and come into contact with the flame of burner just above. This proved to be the case; the leak was stopped, valve made really gas-tight, and once more we were ready to operate.

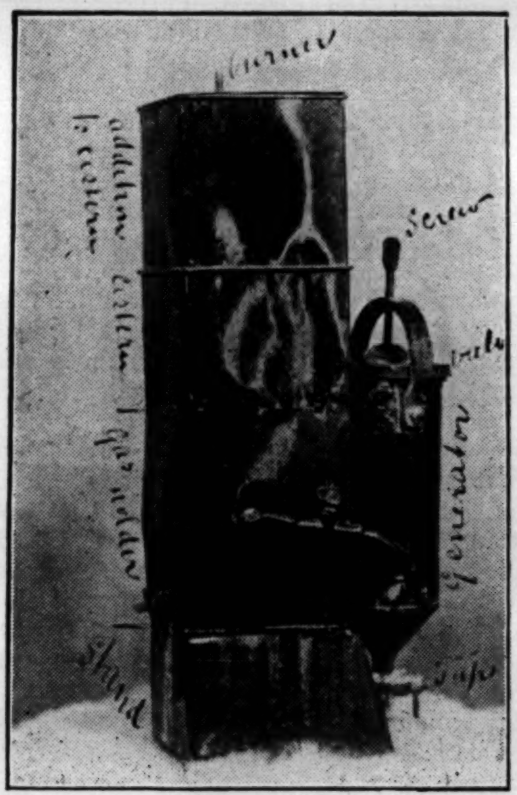
This time all went well until the light was turned out, when water began to rise in the cistern and overflow. This puzzled me, for I had calculated that the cistern should hold all the water that would be displaced by gas before generation was automatically arrested; therefore, in order to check it I stopped top of tube connecting gas holder with cistern. This certainly did arrest the overflow of water, but I afterwards found the tank bulged out by pressure of gas, as shown in photo. I lit the burner again, the overflow ceased, and all went smoothly once more; but this would not do for practical use, as an overflow might happen at any time. I now had to experiment to discover the cause. I found that carbide (like lime) when once wetted all over continued to decompose until reduced to powder. I therefore concluded that the water must be brought *up from below*; this necessitated the carbide being put in first, and the water poured in after. I also took the precaution to increase the depth of cistern (as shown) to 12 inches, and thus everything was apparently under control.

At this stage the particular friend was of course brought in to have a look. He naturally admired the light and wanted to know, how it was done; proud enough, I proceeded to explain, turned off the tap to prevent gas returning to generator (so I thought), then removed the valve, but did not turn out the light, when—pop! bang! went the gas, and out went the light. I had not thought that the gas would return from holder to generator through the water hole, but this is just what it did do; I

got rather a scare,

but no damage was done, a window about a foot away was not even cracked. This *contretemps* led me to introduce a tap to turn off water supply as well as gas; it was accomplished by stopping up the hole, and conveying the water by means of an outside pipe, as shown. As this did away with the necessity of a square generator I took the opportunity to substitute a round one, as possessing greater strength and resisting power. These alterations were a step in the right direction. At last all seemed to be correct, automatic and complete, so that I felt safe in using a larger quantity of carbide to test the consumption per hour; just then the particular friend dropped in, and I proceeded to explain how the drawbacks of a week or so ago had been remedied, and that I could now re-charge without altering or interfering with the pressure of gas, but I took the precaution to turn out the light. After removing valve, I struck a match to show him that the water remained at the same level in the cistern, and growing somewhat bolder, held a match just over the opening of generator, that he might see what carbide looked like, etc., when—bang!—the gas (which was still being given off by the damp carbide) exploded somewhat noisily, but though my face was close to the hole, my hair—of which I have a good supply—was not even singed. Up to this time my operations had been carried on in the back kitchen, but I now thought it wise to remove the scene of future experiments to more convenient premises, namely, a shed at the bottom of the garden.

Strange to say, though I was rather reckless in the use of naked lights during recharging, etc., I never after had a pop. The apparatus underwent many changes, the principal of which was the lengthening of the generator to allow space for residue of lime, etc., the substitution of knife edge bars for perforated zinc, so that this residue might have a free passage, and a tap at bottom to draw it off, with arrangements for cooling the gas, etc.; but as my purpose is to demonstrate the safety of the gas rather than show how to construct a generator, I will not dwell upon or detail them, but to show that—starting in perfect ignorance—I succeeded in perfecting a really effective and safe apparatus. I will just mention a few facts. When at last it was complete I put it into the hands of a patent agent, only to find that some one had been a couple of months beforehand with an almost identical apparatus, which is now placed on the market by a North country firm. Some may think my generator looks a queer customer; well, I suppose it does, having been subject to extensive alterations and improvements, but it works well for all that Some weeks back I used it to supply two burners for a lantern entertainment of about two hours' duration, and obtained splendid results without smoke, smell, or pops, quite equal to the ordinary amateur's rendering of a blow-through jet with considerably less trouble, and at a cost of about sixpence. Later on I supplied six burners while four different photos were taken, the light being perfectly steady throughout.



I think I have said enough to show that even in inexperienced hands, and with imperfect apparatus, nothing like a dangerous explosion took place; in fact, the quantity of gas present at any one time is so small, even with large generators, that a serious explosion is practically impossible. I consider the light by far the most handy yet introduced for lantern work, while it is a real boon for photographers, as by its aid they can laugh at dull days, and take portraits at any hour of day or night; sitters can also be accommodated equally well at their own homes, this is no mean advantage when ladies wish to be taken in evening costume. In addition, it should prove valuable for interior work; while life model sets for the lantern could be taken in the actual rooms intended to be represented—and what an improvement this would be on the backgrounds now used.

Last, but by no means least, though it scarcely comes within the scope of this journal, acetylene gas should prove a safe, economical, and brilliant illuminant for country houses, and should not be long before it wins its way into general favour and appreciation.

I might say that the whole of this paper, copy and transcription, which occupied some hours, was written by light supplied by the above generator with one charge of about a pound; the burner being an air injector of about $\frac{1}{2}$ ft. per hour capacity, supplied by the firm above mentioned, but only suitable for high pressure generators.

* * *

The Royal Photographic Society.

MANY requests having been made for information concerning this Society, the following short account of its constitution and work has been drawn up. Should there be any detail upon which further information is desired, the Secretary will be pleased to supply it upon application to him at the Society's offices.

The Royal Photographic Society was founded in the year 1853, under the title of "The Photographic Society of London," which, in 1874, was changed to "The Photographic Society of Great Britain," and in 1894 was further modified, by Her Majesty's commands, to "The Royal Photographic Society of Great Britain."

The objects for which the Society was established may be summarised in the phrase "the advancement of photography."

Meetings for the reading and discussion of papers are held in the Society's rooms on the second, third, and fourth Tuesdays in each month, from October to June inclusive; those on the third Tuesdays being specially devoted to photo-mechanical processes.

An exhibition is arranged every Autumn—for many years it has been held in Pall Mall—at which are included selected photographs of every kind, and new appliances.

The Society's journal is published monthly, and includes abstracts of the most important photographic work throughout the world. The library of the Society consists of more than 1,200 volumes, and the museum is rapidly increasing in interest.

The Society consists of three classes of members—namely, ordinary members, fellows, and honorary fellows. Anyone who is interested in either the science or the art of photography is eligible for election as an ordinary member. The fellowship, on the contrary, is open only to those members who are able to satisfy the council that they have ability in one or other of the many branches of the subject, and they have a right to place the letters F.R.P.S. after their names, as an indication that their ability has been acknowledged by the Society.

Members pay upon election an entrance fee of one guinea, unless they have been members of an affiliated society for at least two years. An annual subscription of one guinea is payable by ordinary members, and two guineas by fellows, and in both cases future subscriptions may be compounded for by a single payment of ten guineas or twenty guineas respectively. But members elected during the latter half of the year, are liable for one guinea only, which is held to include both the entrance fee and the first year's subscription.

Members have the right of attending all meetings of the Society, and of introducing two visitors to each; they have free admission to the exhibitions of the Society, a number of tickets for their friends, and additional tickets that they may require at half-price. No charge for wall space is made to members of the Society. They receive gratis all publications of the Society, have the free use of the dark room, library, and laboratory, as well as of numerous other dark rooms in this country and abroad.

A nomination form should be filled up with the name and address of the candidate for election, and signed by two members of the Society. Candidates who are not acquainted with any members should communicate with the secretary at the offices, who will be glad to do his best to arrange for their introduction.

Offices :—12, Hanover-square,
London, W.

Architecture as a Subject for Lantern Slides.—No. III.

By T. PERKINS.

AFTER the lens, the kind of plate to be used must be considered. For exteriors any ordinary landscape plate may be used; there is seldom any advantage in using plates of great rapidity, save, perhaps, when buildings are taken from streets, when by using a large aperture and giving a short exposure to a rapid plate, moving figures may be secured without showing signs of motion, but the difficulty may be overcome by the exact reverse of this plan, that is, by using a slow plate and a lens stopped down to $\frac{f}{64}$, which will allow of a long exposure, so that foot passengers and carriages, provided they do not stop, may pass in front of the camera without leaving any trace on the plate. For interiors some plate that will prevent or reduce halation is a great advantage; I do not say that with care in choosing the point of view, so as to avoid including a bright window in the picture, and by careful development negatives almost, if not entirely, free from halation can be obtained on ordinary unbacked plates. Still, it is a great convenience not to have to consider this when arranging a picture, and therefore it is well when setting out to have some at least of the plates backed or otherwise protected against halation, the most perfect preventative is a non-actinic film between the sensitive film and the glass, for then none but non-actinic light can reach the reflecting surface, and this reflected back again on to the sensitive film can do no harm. This method is adopted in Thomas' anti-halation plates, which I have found work admirably. It must not be supposed that halation only shows itself in interiors; a negative of a building in shadow against a bright sky often suffers from this defect. Of course it is desirable to avoid taking a building thus situated with regard to the sun, but sometimes lack of time or other circumstances force the photographer either to make the exposure when the lighting is not at the best, or to leave the subject altogether. This latter course he may be loth to adopt, and under these circumstances an **anti-halation plate** will come in handy. The only drawback to Thomas' anti-halation plates that I have discovered is a tendency to frill with some developers, the non-actinic film separates from the glass, sometimes to a considerable extent; if it does, it is well not to be distressed about it, but to proceed with development and fixing as usual, and then to remove the film from the glass altogether; making the washing water slightly acid will make this easier if necessary. After the film, free from its glass support, has been well washed, it may be easily floated and spread out, while a somewhat larger clean glass plate is slipped under it, and then glass and film may be removed together from the water, the film being carefully spread out, if needful, with a camel-hair brush, and after the superfluous moisture has been blotted off, set up to dry.

An actinometer, such as Watkins' exposure meter, is of great use in interiors, because the actinic variation of light, owing to the colours of the windows, is a difficult matter to judge by the eye alone. One very successful worker whom I know sets his diaphragm before commencing any work, so that the actual time of exposure should be equal to the time that the paper on the actinometer takes to assume the standard tint; thus he has no trouble in looking at a watch or calculating the duration of exposure. As soon as the cap is off, he takes the exposure meter out of his pocket, and as soon as the paper has darkened sufficiently, puts on the cap. Thus, if any variation of light takes place during the exposure owing to the sun going behind a cloud, the meter takes this alteration of light into consideration. Using the instrument thus is far better than determining by its aid before commencing the exposure how many minutes will be required, as not only is time saved, but a more accurate result will be obtained, for the meter is measuring the actual light that is falling on the sensitive plate.

The camera used for architectural work must always be furnished with a level, and be so made that the rising front may be used to a considerable extent; personally, I **never use a swing back** when doing architectural work, as it destroys definition to so great an extent; I much prefer to use a lens that, while it is of the right focal length for the subject, covers a plate much larger than the one I am using, so that it can be raised by means of the rising front till its axis (always kept horizontal) cuts the plate near its upper side; if the lens is one of the kind I have recommended this can be done without any dark corners appearing, and a very moderate amount of stopping down will be sufficient to ensure sharp definition.

The only other things needed for architectural work, as far as I know, are some india-rubber caps to put on the bottoms of the tripod legs to prevent them from slipping on the smooth floors often met with in churches. In the next chapter I shall give some practical hints on the work of exposure.

(*To be continued.*)

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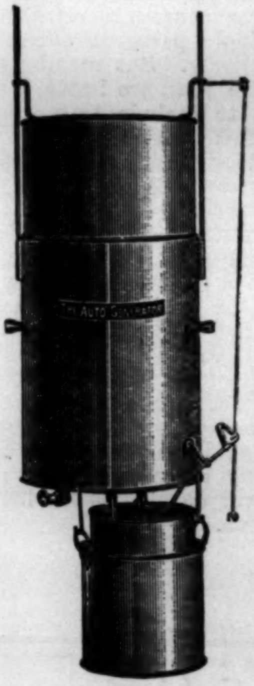
NEW APPARATUS.

"AUTO" ACETYLENE GAS GENERATOR.

This generator having a lower projection is liable to overbalance if set on the edge of a table, so is most securely placed if set upon its own packing case so that the projection is placed somewhat inside of the case. It is manufactured by the Scottish Acetylene Gas Company, of 917, Garscube Road, Glasgow, and although we have not yet tried it, we have examined the principle upon which it works. The lower projection consists of the generator portion, which is surrounded and trapped by water. Two pipes provided with taps connect this with the gasometer portion. The central pipe, which leads from the bottom of the tank, controls the dropping of water upon the charge of calcium carbide by reason of the rod connection with the top of the bell tank. As this commences to rise, so the long lever attached to the tap closes it, there being a slight friction spring connection at the junction of the lever and rod, so as to permit of the greater movement of the latter as the bell rises. As soon as this commences to fall the tap is at once opened, a small quantity of water passes from the gasometer to the generator containing the calcium carbide, and more gas is evolved, thus raising the bell and lever, shutting off the tap.



SLIDE CARRIER.

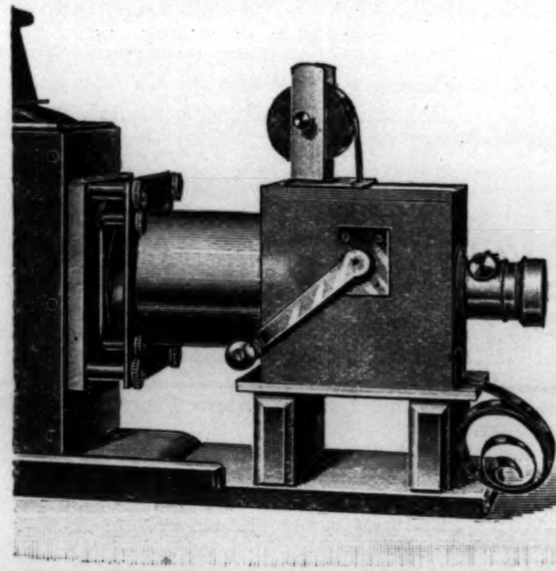
A patent has been granted to Mr. Alfred E. Bingemann, of "Glenholme," Hilltop Road, West Hampstead, for an improvement in lantern carriers whereby plain photographic slides may be tinted in the lantern during their projection. These useful additions are as follows:—Instead of the one mortise as is usually cut to hold the slide, two mortises are provided, one immediately behind the other. The back mortise is provided with a variety of tinter-slides. One is inserted in the back mortise of the carrier and the photograph to be projected is placed in the front mortise. Now, as the light from the lantern passes through the tinter slide first and then the view to be shown, it carries the colour of the tinter slide with it, and so tints the photograph shown on the screen.

RAIN SLIDE.

In our last we made mention of a new rain slide which was about to be brought out. Messrs. W. R. Hill & Son, 33, Portsdown Road, Maida Vale, N.W., have sent us one, and after a trial or two it has proved itself very effective, and gives a realistic representation of a downpour of rain. The slide is, of course, used in a different lantern to the subject view.

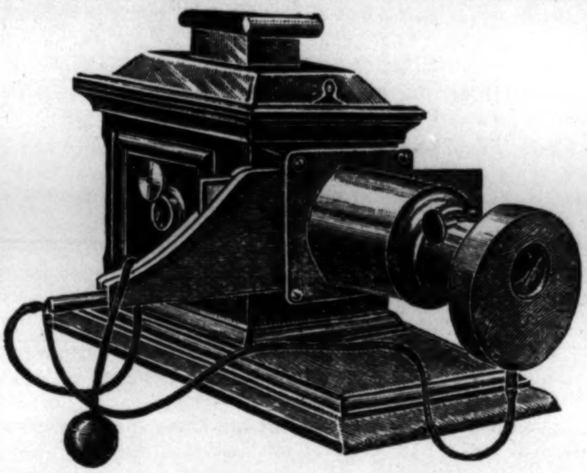
MOTORGRAPH.

This is the name given to an apparatus (for projecting animated photographs), by Messrs. Watson & Sons, of 313, High Holborn. The appliance can readily be attached to any lantern, as shown in the illustration, the lantern lens being first removed. The film, which is of course coiled or rolled up, is fastened between the two upright rods by withdrawing the spindle and running it through the centre of the coil. When in position the end of the film is then pushed through the slot on top, and thence on to the spocket wheel. All that is then necessary is to turn the handle. When taking pictures by this apparatus, which acts as a camera, the sensitised film must of course be covered in. The box portion containing the mechanism measures 6 by 4½ by 5½ inches.



PNEUMATIC CARRIER.

Mr. F. W. Hudlass, of 13, Hartwood Road, Southport, Lancashire, has devised a most ingenious carrier and shutter. The carrier is of the ordinary to and fro carrier size, and the slides are placed into it after the same manner, but unlike with them, the picture is not seen to change; all that happens is that there is a "blink," and another picture is on the screen. The changing of the slides can be effected at any distance, and by the lecturer if desired, which would thus ensure slides coming on at the right time: of course the *next* slide would have to be placed in the carrier by some one at the lantern. Anyway this apparatus is a capital one, and quite a novelty too. The rubber ball is gently squeezed, which causes the shutter in front of the lens to close towards the centre momentarily, when the slide is changed and the translucent shutter again opened. One second suffices for the whole operation.



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Notes and Queries.

D. S. Barrett.—The kind of generator has nothing to do with the candle-power given out by the acetylene gas. This is controlled by the burner or burners. From your note we have no means of knowing how many burners the maker employed when making his calculations. There are now several generators in the market.

Wm. Blake.—1. You will probably obtain the tissues from the Autotype Company, of Oxford Street, London. 2. Print separately as suggested, mount them together, but not quite coincident, and use coloured eye glasses of the same colours as the pictures. Of course, you must use a stereoscopic negative.

E. H. Stevenson.—We do not think you will get the apparatus in better class make, unless ordered specially.

Oxygen Cakes asks how he can make cakes of a style similar to those used for Stedman's oxygen generator? *Ans.*—The following particulars are supplied by the makers of this apparatus. Take four pounds of potass and one pound of black oxide of manganese (the potass must be of the best quality), mix same well, and damp sufficient to hold together, press into a ring and bake slowly till quite dry.

W. Connard.—Communicate with the Manchester Oxygen Company, Great Marlboro Street, Manchester.

Comic.—If you roughly line out on the wrong side of the glass, you can on reversing get the right positions for the masking out shapes.

J. C. White.—We thank you for the information, but in the report there is nothing to say whether the cylinder was a receptacle for gas or not, and we have been unable to ascertain.

Rev. D. B. Lord.—The cylinders are only those of a certain standard irrespective of make. We do not think that the other party has any such rule actually in force, but it will come to it yet.

J. F. Shone.—The 4½-inch condenser will be best suited to your wants, and with regard to the two jets mentioned, the "injector."

E. de Winter.—(1) We regret we cannot supply the list you want. It would amount to many thousands of names. (2) *Re* calcium carbide, see advertisements.

P. W. Grandin.—Fill with air, and empty several times while the bag is warm, and roll up tight at each emptying. Allow it to stand full for a time before emptying.

Rev. A. J. Roberts.—(1) We consider it gross carelessness to bring a light in the proximity of a generator when opening same if it contains any acetylene gas. (2) We use it continually. (3) Acetylene does not consume so much oxygen as an oil light, but we have never heard of the air in a room so "contaminated" that it would not burn well. (4) About 5 per cent. will form an explosive mixture.

A. and J. Smith.—We will look for the generator at your earliest convenience, and are glad to hear it is doing well.

W. W. H.—Communicated by post.

R.—We never heard of the firm mentioned, and perhaps you would be acting wisely in insisting on references.

Santer.—To give replies to such questions as to which is the best—this and that—would take the form of an advertisement, and this we must decline.

Tank.—Mr. Chadwick lives in Manchester, or, at least, has business premises there.

Horton and Jennings write:—In reply to Mr. J. J. Price in "Notes and Queries" of your December issue, we believe Messrs. A. & F. Pears have a splendid collection of slides, but do not know whether they give them or lend.

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Editorial Table.

Bessus Catalogue.—An extensive and nicely bound catalogue has been issued by Messrs. Airs & Co., of Hatton Garden. It is intended for use in the trade, and contains prices and particulars of the Bessus cameras, lanterns and fittings. There are about fifty pages devoted to names of lantern slides.

"The Shakespearean." (London: Dawbarn and Ward, Ltd., 6d. Monthly.)—The first of a new series of this magazine has lately come to hand. The magazine was commenced in May, 1895, by Mr. A. H. Wall, and has been taken over by the present publishers. The editors are Messrs. A. H. Wall and H. Snowden Ward. The contents are interesting and varied.

Annual of Anthony's Photographic Bulletin, 1897.—This annual contains a well selected diversity of matter, high-class illustrations on almost every second page, bold type and good paper. The London agents are Percy Lund, Humphries & Co., Amen Corner, E.C.

Correspondence.

DISSOLVING WITH SINGLE LANTERN.

To the Editor.

Dear Sir,—In answer to Mr. Bird's letter in your last issue, I write to say that the lantern referred to by him must have been that invented by the present Rector of Hilgay, Norfolk, the Rev. Canon Beechey, and exhibited by him at the Exhibition of 1851.

During a brief stay in Norfolk, I had the pleasure of hearing a lantern lecture given by him, and also of seeing his own application of the electric light to his house, church, and observatory.

Besides being still keen on lantern work, he is still active in his ministerial duties, and by his kindness and humility wins the hearts of many around him. He has recently, says the *Norwich Diocesan Gazette*, "attained the great age of ninety years in perfect body and health."

Yours faithfully,

HERBERT NEWMAN, B.A.

Caterham, Surrey.

ELECTRIC LIGHT FOR THE LANTERN.

To the Editor.

Sir,—In justice to the memory of an old friend, the late Mr. William Hart, of Edinburgh, I desire to correct a statement of Mr. Hepworth's, in his article on the "Electric Light in the Optical Lantern," in your journal for December.

After describing the simplest principle of the automatic lamp, he says "this is a very imaginary case, for a lamp built upon such simple lines as this would be utterly impracticable," and yet it was almost exactly on those lines, but with a more complicated carbon holder that Mr. Hart brought out a lamp which was considered a great success. It was first shown publicly before the Royal Scottish Society of Arts on 14th December, 1857, and a description was published in the Society's Transactions for 1859, and for it the Society awarded him their "silver medal and plate, value ten sovereigns."

At this moment I am not sure if it was on the above date that the application of this lamp to the lantern was shown, but it was so shown about that time, and was much admired for the great brilliancy and steadiness of the light, the dropping of the upper carbon and its readjustment being so instantaneous as to be scarcely observable. The recollection of its trial is perhaps the more interesting to me, as it was the only electric lamp applied to the lantern that I have ever seen.

One difficulty in the use of such a lamp, as mentioned by Mr. Hepworth, that of interfering with other lamps of a series, did not exist at that time, as Hart's lamp was worked directly from a galvanic battery. How it would answer at the present day, as one of a series and worked from a dynamo, I do not venture to say, but that it was successful in the way it was shown, cannot be doubted.

Yours truly,

GEO. H. SLIGHT.

Ashburton,
3rd December, 1896.